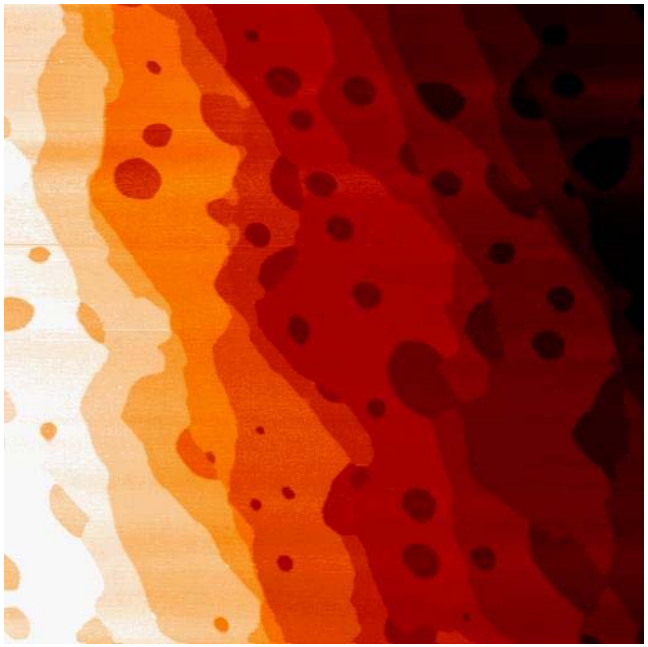
Electrical Transport in Thin Film Nanostructures, Hanno H. Weitering, The University of Tennessee, DMR-0244570

Understanding electrical transport through nanostructures requires perfect control of their structure and morphology, which can sometimes be achieved via *self assembly*. Quantum size effects (QSE) in metallic nanostructures appear to be a strong driving force for self assembly. Ultrathin Pb films on Ge(111) grow in a perfect *bilayer-by-bilayer* fashion at 200 K, due to the QSE. Such films offer perfect opportunity to investigate the fundamentals of transport in relation to the QSE and atomic-scale properties of thin film nanostructures.

M. Ozer and H.H. Weitering, to be published



500x500 nm^2 STM image of a ~10 monolayer (ML) thick Pb film. The film is *atomically flat* over macroscopic distances. Meandering steps result from steps on the Ge(111) substrate wafer. The total Pb dose is slightly less than 10 ML, which explains the presence of the 2 ML "holes" in the film.

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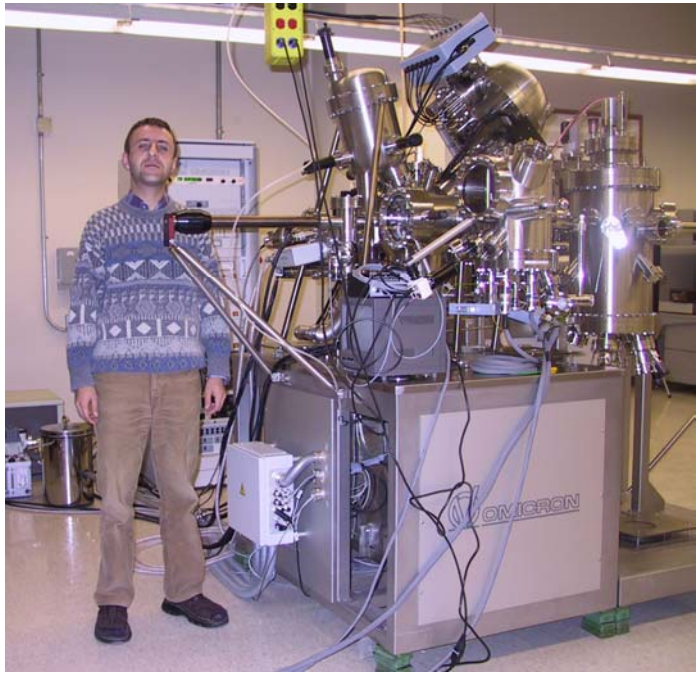
Education: One graduate (Murat Ozer) and one undergraduate student (Jason Smith) contributed to this work. Murat Ozer started his dissertation research in the fall of 2002. Jason Smith graduated at the University of Tennessee in the spring of 2003 and has started his graduate career also at the University of Tennessee. Both students have become skilled operators of the new Molecular Beam Epitaxy system in Weitering's laboratory. Two papers are currently in the works with Ozer and Smith as first and second author, respectively.



Murat Ozer standing next to the MBE machine